

REMARKS

Claims 2-5, 7-10, 12-15 and 17-20 are pending. By this Amendment, claims 2, 4, 5, 7, 9, 10, 12, 14, 15, 17, 19 and 20 are amended and claims 1, 6, 11 and 16 are canceled without prejudice to or disclaimer of the subject matter contained therein. Reconsideration of the application in view of the amendments and following remarks is respectfully requested.

I. REQUEST FOR ACKNOWLEDGEMENT OF RECEIPT OF PRIORITY DOCUMENTS

The Office Action has not acknowledged the priority documents Japanese Patent No. 2000-237365, filed August 4, 2000, and Japanese Patent No. 2001-213544 filed July 13, 2001. These priority documents were submitted on November 5, 2001. Accordingly, please acknowledge receipt of the priority documents to indicate that the requirements of 35 U.S.C. §119 have been satisfied.

II. AMENDMENT TO SPECIFICATION

The paragraph starting on page 12, line 9, has been corrected because the magnetic material "FeAiSi" should be "FeAlSi". Approval to the amendment to the specification is respectfully requested.

III. REJECTION UNDER 35 U.S.C. §103(a)

Claims 1-20 stand rejected under 35 U.S.C. §103(a) over Nakamoto (U.S. Patent No. 5,936,810) in view of Gill (U.S. Patent No. 6,538,859). The rejection is respectfully traversed.

In particular, neither Nakamoto nor Gill, individually or in combination, disclose or suggest a magnetoresistive device including at least a total length of regions of two electrode layers that are laid over the one of the surfaces of a magnetoresistive element is smaller than 0.3 μm , as recited in independent claim 2, and similarly recited in independent claims 7, 12 and 17.

The Office Action asserts that Fig. 5 of Nakamoto discloses a magnetoresistive device where the total length of regions of the two electrode layers that are laid over the one of the surfaces of the magnetoresistive element is smaller than $0.3\text{ }\mu\text{m}$. See, page 3, line 19-page 4, line 2.

On the contrary, Nakamoto instead discloses that the overlap amount corresponding to the distance 34 which the electrode 14 covers the first ferromagnetic film 18 is $0.5\text{ }\mu\text{m}$. Thus, the total overlap amount of the two electrode layers 14 is $1.0\text{ }\mu\text{m}$. See, for example, col. 9, lines 20-28.

Moreover, Nakamoto further discloses that the overlap amount of one electrode layer 14 is preferably not smaller than $0.25\text{ }\mu\text{m}$. See, for example, col. 9, line 66-col. 10, line 10. Stated differently, Nakamoto discloses or suggests that the total overlap amount of the two electrode layers 14 is preferably no smaller than $0.5\text{ }\mu\text{m}$. Therefore, Nakamoto teaches away from the subject matter of the independent claims.

Gill does not compensate for the above noted deficiency of Nakamoto. That is, Gill discloses in Fig. 6, a spin valve(SV) sensor 600 having an antiferromagnetic layer 620 deposited over a third sublayer 612 to the thickness at which the desired exchange properties are achieved. A laminated antiparallel (AP) pin layer 622 is formed on the antiferromagnetic layer 620 in the central region 606. The AP pin layer 622 comprises a first ferromagnetic layer FM1 624, a second ferromagnetic layer FM2 628 and an antiparallel coupling (APC) layer 626 disposed between the FM1 layer 624 and the FM2 layer 628.

However, Gill does not disclose, teach or even suggest the total length of regions of the two electrode layers that are laid over the one of the surfaces of the magnetoresistive element is smaller than $0.3\text{ }\mu\text{m}$.

Furthermore, the above feature would not have been obvious to one skilled in the art because neither Nakamoto nor Gill even teach, disclose or suggest or provide motivation to one skilled in the art to derive the above-noted features of the independent claims.

As described in page 25-page 27 of the present application, bias field applying layers 18 are located on both sides of the MR element 5. Consequently, dead regions 5B are created near the ends of the MR element 5 which do not contribute to producing outputs of the magnetoresistive device. The region MR element 5 except the dead regions 5B has an active region 5A in which a signal field is detectable.

As shown in Fig. 10 of the present application, two electrode layers 6 extend to the top of the active region 5A of the MR element 5. As a result, the proportion of sense current that passes through the dead regions 5B is smaller, compared to the magnetoresistive device of Fig. 9. Thus, the output of the magnetoresistive device is increased when the electrode layers 6 overlap the MR element 5.

However, if attention is drawn to the effective track width that is required as one of the characteristics of the thin film magnetic head, table 1 on page 24 shows that an adverse affect on the effective track width increases as the overlap amount L_0 increases. As a result, the effect of the longitudinal magnetic field is reduced and effective track width is thereby made unstable.

As shown in Fig. 11 of the application, when the overlap amount L_0 is $0.15\text{ }\mu\text{m}$, the mean value of the effective track width MRW-mean is extremely close to the normalized maximum value, and the maximum value of the effective track width MRW-max expected from the variation in effective track width is greater than the normalized maximum value by about $0.03\text{ }\mu\text{m}$. In this case, among entire heads that are manufactured, the proportion of heads whose effective track width are greater than the normalized maximum value is very large, and the yield of the head is expected to be reduced.

Therefore, it is preferred that the overlap amount L_0 is smaller than $0.15\ \mu\text{m}$.

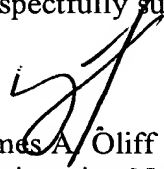
Based on the above, it is respectfully submitted that the criticality of smaller than $0.3\ \mu\text{m}$ as recited in the independent claims, for reasons as discussed above, would not have been obvious to one skilled in the art. Accordingly, independent claims 2, 7, 12 and 17 define patentable subject matter. Claims 3-5, 8-10, 13-15 and 18-20 depend from the respective independent claims, and therefore also define patentable subject matter. Accordingly, the withdrawal of the rejection under 35 U.S.C. §103(a) is respectfully requested.

IV. CONCLUSION

In view of the foregoing amendments and remarks, this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 2-5, 7-10, 12-15 and 17-20 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in better condition for allowance, the Examiner is invited to contact the undersigned attorney at the telephone number listed below.

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Date: June 30, 2003

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